

## **ABSTRACT**

Apparatus (10) for establishing the positions of metal objects in a mixed input stream of both metal and non-metal objects, the apparatus comprising a differential metal-detecting coil (14A) having a first coil portion wound in a first sense and a second coil portion of generally similar shape and size to the first, wound in a second sense opposite to the first sense, and conveying means (11) for moving objects with respect to, and past, the differential metal-detecting coil in a plane and in a direction with unit vector  $\hat{\mathbf{a}}$ , characterised in that the second coil portion is displaced from the first coil portion by a displacement  $\mathbf{B}$  having a component in the plane in a direction with unit vector  $\hat{\mathbf{b}}$ , wherein  $0 < \cos^{-1} \hat{\mathbf{a}} \cdot \hat{\mathbf{b}} < \pi/2$ , and in that the apparatus further comprises analysing means for analysing the form of the output voltage of the coil as a function of time to establish the position of said metal objects in a direction  $\hat{\mathbf{c}}$  in the plane, where  $\hat{\mathbf{c}}$  is defined by  $\hat{\mathbf{a}} \cdot \hat{\mathbf{c}} = 0$ .